

CLAIMS

We claim:

1. A method of selecting delay positions for a RAKE receiver, comprising:
 - searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values
 - 5 while maintaining a minimum distance between the multi-path delays during a first time interval;
 - determining respective SIRs and/or power values associated with the respective multi-path delays during a second time interval;
 - filtering the respective SIRs and/or power values based on the SIRs and/or
 - 10 power values obtained during searching the plurality of multi-paths and determining respective SIRs and/or power values;
 - for each of the respective multi-path delays, comparing the respective filtered SIR and/or power value associated with the respective multi-path delay with the SIRs and/or power values associated with delays immediately adjacent to the respective
 - 15 multi-path delay;
 - for each of the respective multi-path delays, adjusting a respective multi-path delay position based on comparing the respective filtered SIR and/or power value associated with the respective multi-path delay with the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay;
 - 20 and
 - assigning the respective multi-path delay positions to fingers of a RAKE receiver.
2. The method of Claim 1, wherein filtering the respective SIRs and/or
- 25 power values comprises:
 - for each of the respective multi-path delays:
 - multiplying the SIR and/or power value obtained during the first time interval by a scaling factor X to obtain a first product;
 - multiplying the SIR and/or power value obtained during the second
 - 30 time interval by (1-X) to obtain a second product; and

adding the first and second products to obtain a filtered SIR and/or power value.

3. The method of Claim 1, wherein comparing the respective filtered SIR
5 and/or power value associated with the respective multi-path delay with the filtered
SIRs and/or power values associated with delays immediately adjacent to the
respective multi-path delay comprises:

multiplying the filtered SIRs and/or power values associated with delays
immediately adjacent to the respective multi-path delay by a scaling factor that is
10 between 0 and 1; and

determining if the respective filtered SIR and/or power value is greater than
the scaled filtered SIRs and/or power values associated with the delays immediately
adjacent to the respective multi-path delay.

15 4. The method of Claim 3, wherein adjusting the respective multi-path
delay position comprises:

adjusting the respective multi-path delay position if the respective filtered SIR
and/or power value for the respective multi-path delay is not greater than at least one
of the scaled filtered SIRs and/or power values associated with the delays immediately
20 adjacent to the respective multi-path delay.

5. The method of Claim 4, wherein adjusting the respective multi-path
delay position comprises:

determining a number N of multi-path delays between the respective multi-
25 path delay and one of the multi-path delays for which an adjusting decision has been
previously made; and

adjusting the respective multi-path delay position of the respective multi-path
delay to ensure that the respective multi-path delay and the one of the multi-path
delays for which an adjusting decision has previously been made are separated by at
30 least a distance of $N * \text{the minimum distance between the multi-path delays}$.

6. The method of Claim 4, further comprising:

scaling the filtered SIR and/or power value for the respective multi-path delay to reduce the filtered SIR and/or power value at a previous multi-path delay position after adjusting the respective multi-path delay position if the respective filtered SIR and/or power value for the respective multi-path delay is not greater than the scaled
5 filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path delay.

7. A system for selecting delay positions for a RAKE receiver, comprising:
- 10 means for searching a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values while maintaining a minimum distance between the multi-path delays during a first time interval;
- means for determining respective SIRs and/or power values associated with
15 the respective multi-path delays during a second time interval;
- means for filtering the respective SIRs and/or power values based on the SIRs and/or power values obtained during searching the plurality of multi-paths and determining respective SIRs and/or power values;
- for each of the respective multi-path delays, means for comparing the
20 respective filtered SIR and/or power value associated with the respective multi-path delay with the SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay;
- for each of the respective multi-path delays, means for adjusting a respective multi-path delay position based on comparing the respective filtered SIR and/or power
25 value associated with the respective multi-path delay with the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay; and
- means for assigning the respective multi-path delay positions to fingers of a RAKE receiver.
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8. The system of Claim 7, wherein the means for filtering the respective SIRs and/or power values comprises:
- for each of the respective multi-path delays:

means for multiplying the SIR and/or power value obtained during the first time interval by a scaling factor X to obtain a first product;

means for multiplying the SIR and/or power value obtained during the second time interval by $(1-X)$ to obtain a second product; and

5 means for adding the first and second products to obtain a filtered SIR and/or power value.

9. The system of Claim 7, wherein the means for comparing the respective filtered SIR and/or power value associated with the respective multi-path
10 delay with the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay comprises:

means for multiplying the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay by a scaling factor that is between 0 and 1; and

15 means for determining if the respective filtered SIR and/or power value is greater than the scaled filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path delay.

10. The system of Claim 9, wherein the means for adjusting the respective
20 multi-path delay position comprises:

means for adjusting the respective multi-path delay position if the respective filtered SIR and/or power value for the respective multi-path delay is not greater than at least one of the scaled filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path delay.

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11. The system of Claim 10, wherein the means for adjusting the respective multi-path delay position comprises:

means for determining a number N of multi-path delays between the respective multi-path delay and one of the multi-path delays for which an adjusting decision has
30 been previously made; and

means for adjusting the respective multi-path delay position of the respective multi-path delay to ensure that the respective multi-path delay and the one of the multi-path delays for which an adjusting decision has previously been made are

separated by at least a distance of $N \times$ the minimum distance between the multi-path delays.

12. The system of Claim 10, further comprising:

5 means for scaling the filtered SIR and/or power value for the respective multi-path delay to reduce the filtered SIR and/or power value at a previous multi-path delay position after adjusting the respective multi-path delay position if the respective filtered SIR and/or power value for the respective multi-path delay is not greater than the scaled filtered SIRs and/or power values associated with the delays immediately
10 adjacent to the respective multi-path delay.

13. A computer program product for selecting delay positions for a RAKE receiver, comprising:

a computer readable storage medium having computer readable program code
15 embodied therein, the computer readable program code comprising:

computer readable program code configured to search a plurality of multi-paths to select a set of multi-path delays associated with the highest signal to interference ratios (SIRs) and/or power values while maintaining a minimum distance between the multi-path delays during a first time interval;

20 computer readable program code configured to determine respective SIRs and/or power values associated with the respective multi-path delays during a second time interval;

computer readable program code configured to filter the respective SIRs and/or power values based on the SIRs and/or power values obtained during searching
25 the plurality of multi-paths and determining respective SIRs and/or power values;

for each of the respective multi-path delays, computer readable program code configured to compare the respective filtered SIR and/or power value associated with the respective multi-path delay with the SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay;

30 for each of the respective multi-path delays, computer readable program code configured to adjust a respective multi-path delay position based on comparing the respective filtered SIR and/or power value associated with the respective multi-path

delay with the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay; and

computer readable program code configured to assign the respective multi-path delay positions to fingers of a RAKE receiver.

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14. The computer program product of Claim 13, wherein the computer readable program code configured to filter the respective SIRs and/or power values comprises:

for each of the respective multi-path delays:

10 computer readable program code configured to multiply the SIR and/or power value obtained during the first time interval by a scaling factor X to obtain a first product;

computer readable program code configured to multiply the SIR and/or power value obtained during the second time interval by (1-X) to obtain a second

15 product; and

computer readable program code configured to add the first and second products to obtain a filtered SIR and/or power value.

15. The computer program product of Claim 13, wherein the computer
20 readable program code configured to compare the respective filtered SIR and/or power value associated with the respective multi-path delay with the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay comprises:

25 computer readable program code configured to multiply the filtered SIRs and/or power values associated with delays immediately adjacent to the respective multi-path delay by a scaling factor that is between 0 and 1; and

computer readable program code configured to determine if the respective filtered SIR and/or power value is greater than the scaled filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path
30 delay.

16. The computer program product of Claim 15, wherein the computer readable program code configured to adjust the respective multi-path delay position comprises:

5 computer readable program code configured to adjust the respective multi-path delay position if the respective filtered SIR and/or power value for the respective multi-path delay is not greater than at least one of the scaled filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path delay.

10 17. The computer program product of Claim 16, wherein the computer readable program code configured to adjust the respective multi-path delay position comprises:

15 computer readable program code configured to determine a number N of multi-path delays between the respective multi-path delay and one of the multi-path delays for which an adjusting decision has been previously made; and

20 computer readable program code configured to adjust the respective multi-path delay position of the respective multi-path delay to ensure that the respective multi-path delay and the one of the multi-path delays for which an adjusting decision has previously been made are separated by at least a distance of $N * \text{the minimum distance between the multi-path delays}$.

18. The computer program product of Claim 16, further comprising:

25 computer readable program code configured to scale the filtered SIR and/or power value for the respective multi-path delay to reduce the filtered SIR and/or power value at a previous multi-path delay position after adjusting the respective multi-path delay position if the respective filtered SIR and/or power value for the respective multi-path delay is not greater than the scaled filtered SIRs and/or power values associated with the delays immediately adjacent to the respective multi-path delay.

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